

REMARKS

In response to the Office Action mailed March 28, 2003, claim 41 has been cancelled without any prejudice and a disclaimer and claims 10, 11, 40, 42 , 45 and 46 have been amended. Claims 10-13, 40 and 42-46 are now active in this application, of which claims 10 and 40 are independent.

Based on the above Amendments and the following Remarks, Applicants respectfully request that the Examiner reconsider the outstanding objections and rejections and they be withdrawn.

Claim Objection

In the Office Action, claim 40 has been objected to for informalities. This objection is respectfully traversed.

In this response, claim 40 is amended to group the gate wire with the gate insulating layer and the data wire with the passivation layer, as suggested by the Examiner. Amended claim 40 recites "a transparent conductive layer *pattern directly contacting with and connected to the gate wire through a first contact hole of the gate insulating layer or directly contacting with and connected to the data wire through the passivation layer*".

Accordingly, withdrawal of the objection is respectfully requested.

Rejections Under 35 U.S.C. §112

In the Office Action, claim 45 has been rejected under 35 U.S.C. §112, first paragraph. This rejection is respectfully traversed.

In this response, claim 45 is amended to recite "a drain electrode separated from the *source* electrode and opposite to the *source* electrode with respect to the gate electrode", as pointed out by the Examiner.

Accordingly, Applicants respectfully request that the rejection over claim 45 be withdrawn.

Rejections Under 35 U.S.C. §102

In the Office Action, claims 40 and 44 have been rejected under 35 U.S.C. §102(e) for being anticipated by U. S. Patent Publication No. 2002/0061410 A1 issued to Sasaki, *et al.* ("Sasaki"). This rejection is respectfully traversed.

In this response, independent claim 40 has been amended to incorporate all the limitations of its dependent claim 41. Amended claim 40 recites (a) "a gate wire including a first conductive layer ...", (b) "a data wire including a second conductive layer ..." and (c) "wherein the first conductive layer or the second conductive layer includes metal containing an aluminum-based material".

In this regard, in Fig. 1 of Sasaki, the gate wiring (e.g., the gate electrode 3 and the lower pad layer 17) is "made of a copper thin film" (Page 2, Paragraphs 0028 and 0031). Also, Sakai describes "A source electrode 7 and drain electrode 8 comprising a copper thin film ..." (Page 2, Paragraph 0028).

Thus, Sasaki fails to teach or suggest the gate wire and the data wire made of metal containing an aluminum-based material, as recited in claim 40, and hence would be patentable over Sasaki. Claim 44 that is dependent from claim 40 would be also patentable at least for the same reason.

Accordingly, Applicants respectfully request that the rejection over claims 40 and 44 be withdrawn.

Rejections Under 35 U.S.C. §103

In the Office Action, claims 10-13 have been rejected under 35 U.S.C. §103(a) for being unpatentable over Sasaki in view of U. S. Patent No. 6,222,595 B1 issued to Zhang, *et al.* ("Zhang"). This rejection is respectfully traversed.

Amended independent claim 10 recites "A contact structure of a wire, comprising: a wire including a conductive material made of an aluminum-based material; an inorganic insulating layer covering the wire and having a contact hole exposing the wire; and a conductive layer made of indium zinc oxide, formed on the insulating layer and contacting the wire through the contact hole".

As admitted by the Examiner, Sasaki fails to teach or suggest " a wire including a conductive material made of an aluminum-based material ". Regarding this missing feature, the Examiner stated that Zhang teaches the first conductive material 412 in Fig. 4B and the second conductive material 424, 426 and 427 in Fig. 4D include metal of an aluminum-based material.

Based upon these two pieces of prior art, the Examiner asserted that it would have been obvious to recognize that combining Zhang's process with Sasaki's invention would have been beneficial because it helps provide short-circuiting between wiring lines. This assertion is respectfully disagreed with.

In Zhang, the gate electrodes 411 and 412 in Fig. 4B is formed by patterning the aluminum film 406 in Fig. 4A. As shown in Figs. 4A to 4E, the gate electrode 412 is covered by

the first interlayer insulating film 423 made of silicon nitride. However, Zhang fails to teach or suggest an *IZO conductive layer* formed on the first interlayer insulating film 423 and contacting the gate electrode 412 through a contact hole formed in the first interlayer insulating film 423, as recited in claim 10.

Also, Fig. 4D shows a gate wiring line 425 formed on the first interlayer insulating film 423 and contacting the gate electrode 411 through a contact hole formed in the first interlayer insulating film 423, but the gate wiring line 425 is formed of "lamine films of titanium and a material mainly made of aluminum" (Column 7, Lines 6-9). The contact structure including the gate electrode 411 fails to teach or suggest an *IZO conductive layer* formed on the first interlayer insulating film 423 and contacting the gate electrode 411, as claimed.

Fig. 4D further shows the source wiring line 424 and the drain wiring line 426 that are formed of "lamine films of titanium and a material mainly made of aluminum" (Column 7, Lines 6-9). However, they are formed on the silicon nitride first interlayer insulating film 423 and contacting the polysilicon source and drain regions 413 and 414 through the contact holes formed in the first interlayer insulating film 423.

Thus, in Zhang, the source wiring line 424 and the drain wiring line 426 are not covered by the first interlayer insulating film 423 and there is no *IZO conductive layer* formed on the first interlayer insulating film 423 and contacting the source wiring lines 424 and the drain wiring line 426 through a contact hole formed in first interlayer insulating film 423 to expose the source wiring line 424 and the drain wiring line 426.

As described above, neither Sasaki nor Zhang teaches or suggests the claimed wire including a conductive material made of an aluminum-based material and covered by an inorganic insulating layer having a contact hole exposing the wire, as recite in claim 10.

Regarding the asserted combination, if the structure shown in Fig. 1 of Sasaki is modified to replace the copper-based gate electrode with the aluminum-based gate electrode 411 or 412 of Zhang, the gate electrode would be formed on the passivation layer 9 since Zhang teaches the gate electrodes 411 and 412 formed on the first interlayer insulating layer 423. Thus, the asserted modification would render the structure shown in Fig. 1 of Sasaki unsatisfactory to its intended purpose (i.e., transistor).

For the reasons above, it is submitted that independent claim 10 is patentable over Sasaki and Zhang. Claims 11-13 that are dependent from claim 10 would be also patentable at least for the same reason. Accordingly, Applicants respectfully request that the rejection over claims 10-13 be withdrawn.

In the Office Action, claims 41-43 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki and in view of Zhang. This rejection is respectfully traversed.

As to the asserted combination, as previously mentioned, if the structure shown in Fig. 1 of Sasaki is modified to replace the copper-based gate electrode 3 with the aluminum-based gate electrode 411 or 412 of Zhang, the gate electrode would be formed on the passivation layer 9 since Zhang teaches the gate electrodes 411 and 412 formed on the first interlayer insulating layer 423. Thus, the asserted modification would render the structure shown in Fig. 1 of Sasaki unsatisfactory to its intended purpose (i.e., transistor).

Also, amended independent claim 40 recites (a) "a gate wire including a first conductive layer", (b) "a data wire including a second conductive layer on the gate insulating layer and the semiconductor layer" and (c) "wherein the first conductive layer or the second conductive layer includes metal containing an aluminum-based material". In this regard, Sasaki fails to teach or

suggest the gate wire and the data wire include metal containing an aluminum-based material, as admitted by the Examiner.

Zhang teaches the gate electrodes 411 and 412 formed of aluminum and the source wiring line 424 and the drain wiring line 426 formed of aluminum. However, as shown in Fig. 4D, the gate electrodes 411 and 412 are *formed on the gate insulating layer 405*. Thus, Zhang fails to teach or suggest (a) the gate insulating layer 405 covering the gate electrodes 411 and 412, (b) polysilicon source and drain regions 413-416 (e.g., claimed semiconductor layer) formed on the gate insulating layer 405.

As such, none of the applied references teaches or suggests a gate wire including a first conductive layer, which includes metal containing an aluminum-based material and *covered by a gate insulating layer*, as recited in claim 40. Thus, it is submitted that claim 40 is patentable over Sasaki and Zhang. Claims 42 and 43 are dependent from claim 40, and therefore would be also patentable at least for the same reason.

Accordingly, Applicants respectfully request that the rejection over claims 42 and 43 be withdrawn.

In the Office Action, claims 45 and 46 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki in view Zhang and further in view of U. S. Patent No. 6,072,450 to Yamada, et al. ("Yamada") This rejection is respectfully traversed.

Claims 45 and 46 are dependent from claim 40. As previously mentioned, claims 40 has been amended and is now believed to be patentable over Sasaki and Zhang. Specifically, neither Sasaki nor Zhang teaches or suggests a gate wire including a first conductive layer, which includes metal containing an aluminum-based material and *covered by a gate insulating layer*, as

recited in claim 40. Also, Sasaki and Zhang are not combinable as the asserted combination would render the structure shown in Fig. 1 of Sasaki unsatisfactory to its intended purposes.

Yamada fails to cure the deficiency from the teaching of Sasaki. Yamada is directed to forming selection transistors and drive transistors in individual pixel areas but fails to teach or a gate wire including a first conductive layer, which includes metal containing an aluminum-based material and *covered by a gate insulating layer*, as recited in claim 40.

Thus, it would not have been obvious to combine the teachings of Sasaki and Yamada to arrive at the invention defined in claim 40. Claims 45 and 46 are dependent from claim 40 and hence would be also patentable at least for the same reason.

Accordingly, Applicants respectfully request that the rejection over claims 45 and 46 be withdrawn.

Other Matters


In this response, claims 10, 11, 42, 45 and 46 have been further amended for better wording and for correcting informalities therein.

CONCLUSION

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete response has been made to the outstanding Office Action and, as such, claims 10-13, 40 and 42-46 are in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment is respectfully requested.

Respectfully submitted,


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